

Appl. No. : 10/672,469
Filed : September 26, 2003

IN THE SPECIFICATION:

Please amend the specification as follows:

(1) The paragraph 3 (from page 1, line 18 to page 1, line 21) has been amended as follows:

[0003] In an electron beam exposure apparatus, a deflection control section controls deflectors to deflect an electron beam, and ~~contact~~ electrical connection between the deflection control section and the deflector is checked by measuring the deflected electron beam.

(2) The paragraph 4 (from page 1, line 22 to page 1, line 25) has been amended as follows:

[0004] However, many numbers of processes are required for the measurement of the electron beam and complicated electrical connections are involved in the electron beam exposure apparatus. Therefore, it is difficult to check the ~~contact connections~~ between the deflection control section and the deflector conventionally. Thus, what is needed is a circuit structure embedded in an electron beam exposure apparatus that enables a self-testing to check the connections before deflecting the electron beams.

(3) The paragraph 37 (from page 11, line 20 to page 11, line 24) has been amended as follows:

[0037] For example, the plurality of deflectors 202-1 to ~~212-n~~ 202-n are arrayed and integrated on the semiconductor substrate 300. Moreover, the plurality of deflectors 202-1 to

Appl. No. : 10/672,469
Filed : September 26, 2003

202-n deflect the plurality of electron beams 402-1 to 402-n respectively based on the deflection control signals.

(4) The paragraph 44 (from page 13, line 22 to page 13, line 26) has been amended as follows:

[0046] Therefore, in case that the diagnostic control signal is the first value, each of the plurality of flip-flops 204-1a to 204-nb stores the values (scan test data) of the corresponding deflection control signals. Thereby, the shift register 200 stores the values (scan vector: a set of scan test data) of the plurality of deflection control signals in parallel.

(5) The paragraph 45 (from page 13, line 27 to page 14, line 8) has been amended as follows:

[0045] Moreover, the flip-flop 204 outputs the stored value according to the clock signal received by the input terminal CK. Therefore, each of the plurality of flip-flops 204-1a to 204-nb supplies the value of the stored deflection control signal to the next flip-flop 204 according to the clock signal. In other words, the scan vector received in parallel fashion is shifted in a series fashion in the shift register 200 by the timing of the clock signal. Thereby, the shift register 200 outputs the values (scan vector) of the stored deflection control signals to the diagnostic result-signal output terminal 214 in series according to the clock signal. The deflection control section 92 receives the output signal

Appl. No. : 10/672,469
Filed : September 26, 2003

from the shift register 200 as the diagnostic result signal based on the plurality of deflection control signals. Thereby, the scan test for the plurality of deflection control signals, which are to be received by the plurality of deflecting electrodes 302-1a to 302-nb, is performed.

(6) The paragraph 48 (from page 14, line 23 to page 15, line 24) has been amended as follows:

[0048] In the present embodiment, the deflection control section 92 supplies the deflection control signal to the deflector 202 through the deflection control signal input terminal 212. Moreover, the shift register 200 stores the value of the deflection control signal between the deflection control signal input terminal 212 and the deflector 202, and outputs the diagnostic result signal based on the deflection control signal. Moreover, the deflection control signal input terminal 212, the deflector 202, and the shift register 200 are integrated on the single semiconductor substrate 300. Therefore, the deflection control section 92 diagnoses the ~~contact~~ electrical connection between each of the plurality of deflectors 202-1 to 202-n and the deflection control section 92 based on the diagnostic result signal. For example, the deflection control section 92 identifies the deflector 202 which is not connected to the deflection control section 92 by comparing the value of the diagnostic result signal with an expected value. According to the present embodiment, the

Appl. No. : 10/672,469
Filed : September 26, 2003

~~contact~~ connection between the deflection control section 92 and the deflector 202 is checked easily. Thereby, it is easily judged whether the malfunction of the electron beam exposure apparatus 100 is caused by the defect of the ~~contact~~ connection or not.

(7) The paragraph 49 (from page 15, line 12 to page 15, line 19) has been amended as follows:

[0049] According to another embodiment, each deflector 202 includes three or more deflecting electrodes 302. The three or more deflecting electrodes 302 receive deflection control signals, which are independent from one another. The shift register 200 stores three or more deflection control signals (scan vectors) received by the deflector 202, respectively. Also in this case, the ~~contact~~ electrical connection between the deflection control section 92 and the deflector 202 can be checked easily.

(8) The paragraph 52 (from page 16, line 8 to page 16, line 19) has been amended as follows:

[0052] Next, the deflection control section 92 outputs the diagnostic control signal of the second value, and opens the switch 206 (S108). Then, the shift register 200 outputs the diagnostic result signal according to the clock signal (S110). Then, the deflection control section 92 diagnoses the ~~contact~~ connection between the deflection control section 92 and the deflector 202 (S112) by performing the scan test for the

Appl. No. : 10/672,469
Filed : September 26, 2003

connection. If there is a deflector 202 which is not connected correctly, the electron beam exposure apparatus 100 terminates the operation. In this case, the electron beam exposure apparatus 100 may identify and display the deflection control signal input terminal 212 corresponding to the deflector 202 which is not connected. Thereby, ~~The~~ the fault is easily detectable.

(9) The paragraph 54 (from page 16, line 24 to page 16, line 29) has been amended as follows:

[0054] Next, the electron beam generating section 10 generates the electron beam 402, and the deflector 202 deflects the electron beam 402 and exposes the wafer 44 (S118). According to the present embodiment, the ~~contact~~ electrical connection between the deflection control section 92 and the deflector 202 can be diagnosed before the generation of the electron beam 402.